



Univox 7-Series High Efficiency Linear Technology Installation Guide

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Univox® 7-Series High Efficiency Linear Technology Installation Guide



Univox® PLS-7 part no 217700
Univox® SLS-7 part no 227000
Univox® PLS-7D Univox® SLS-7D
part no 217710 part no 227010

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Introduction

Univox® 7-Series

Univox® 7-Series drivers combine 50 years of experience with the newest electronic design to deliver unrivalled quality in a compact stylish housing. Developed on Univox linear switching technology the 7-Series provide extraordinary sound clarity, power and performance as well as outstanding features such as low weight, size, and exceptionally high efficiency. Overall performance with the high voltage available follows the latest demands of the IEC 60118-4 and IEC 60498-1 standards, giving high quality sound for music as well as for speech.

Univox PLS-7 and its phased array sibling SLS-7 are powerful induction loop amplifiers designed for very large-area loop installations. PLS-7 delivers up to 100 Vpp/20Arms while the SLS-7 drives up to 100 Vpp and 10 Arms per channel. With wide dynamic response from complementary balanced outputs, PLS/SLS-7 drivers provide excellent dynamics with top audio quality. Our ground-breaking filter bank eliminates any Class-D associated non-linearity or interference. Due to Class D low heat dissipation, the drivers claim no extra ventilation space in your AV-rack.

SLS system

SLS system is based on overlapping loops, providing a more controlled field strength distribution with less overspill. Any size venue can be covered and transmission secured in several directions. The mute effect that occurs when a hearing aid wearer is tilting their head, common for standard loop systems, is efficiently eliminated. Detailed information about SLS design, with several different approaches and visualized in 3-D simulation for a comprehensive understanding, can be accessed in Univox Loop Designer (ULD).

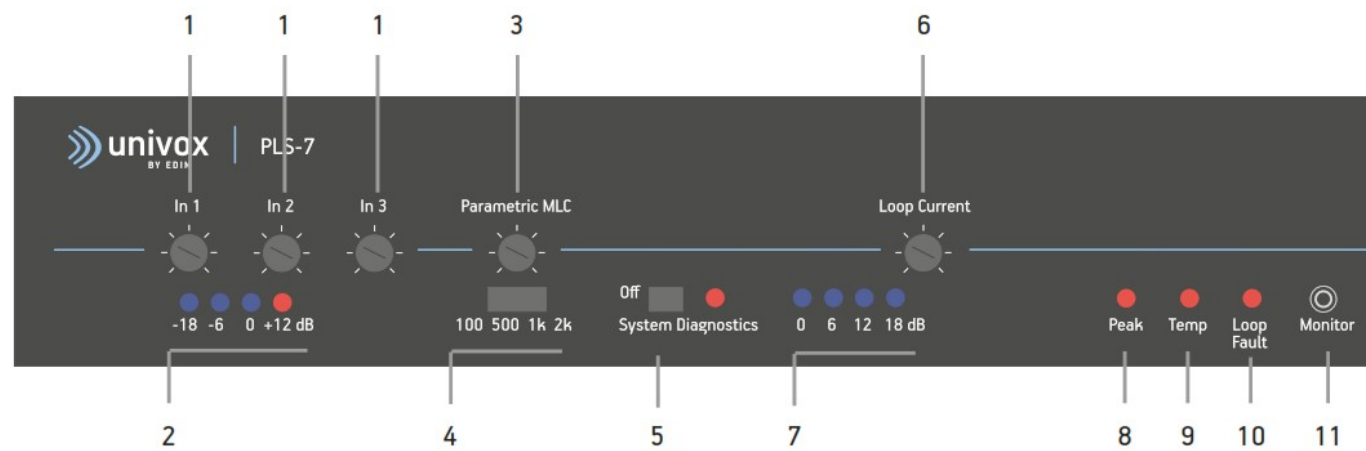
Included in package

- Loop driver
- DC Power Supply
- Power cable
- 3 pcs of phoenix screw terminals
- 4 pcs of rubber feet (preassembled)
- T-Sign according to ETSI-standard
- Rack mounting plate with 8 screws
- Certificate/Measuring protocol

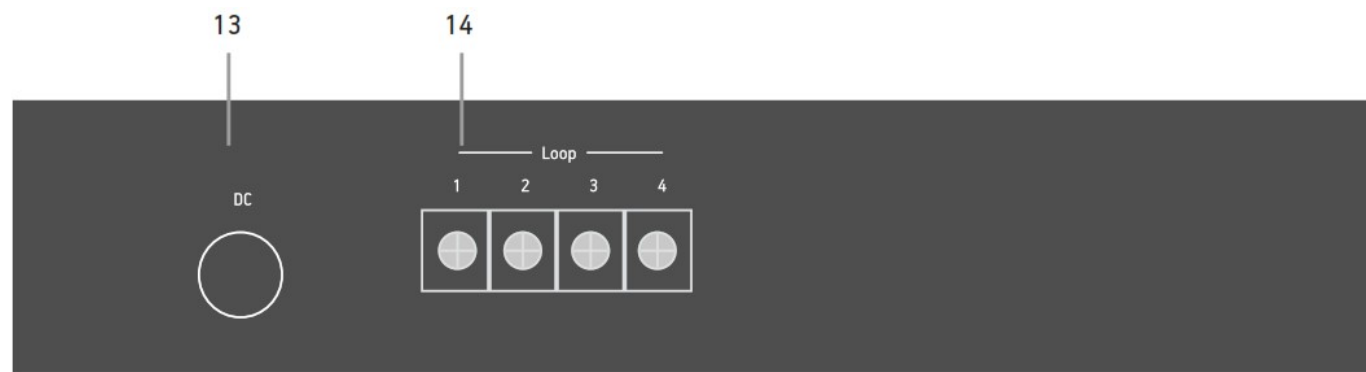
- Installation guide

Connections and controls PLS-7

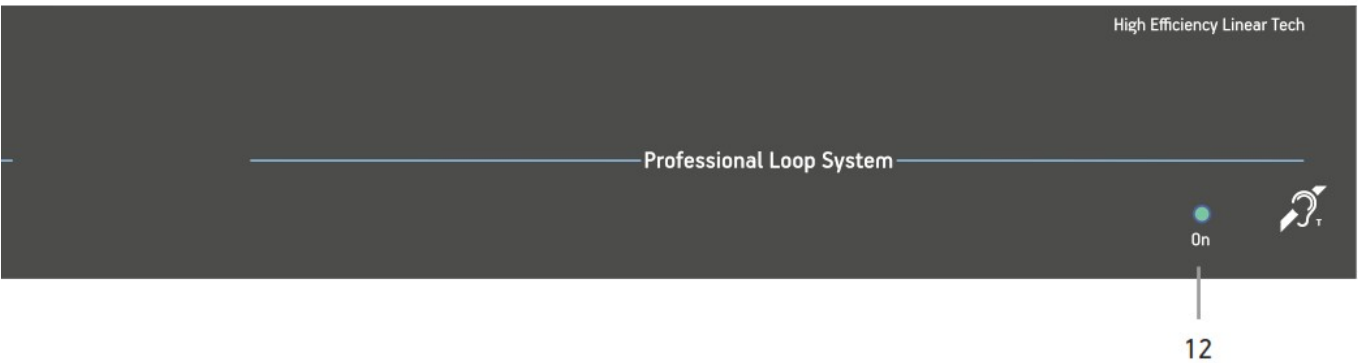
Overview



1. Input level potentiometers 2. Input level LED bar graph 3. Parametric MLC control	4. Parametric MLC knee point switch 5. System diagnostics switch and LED
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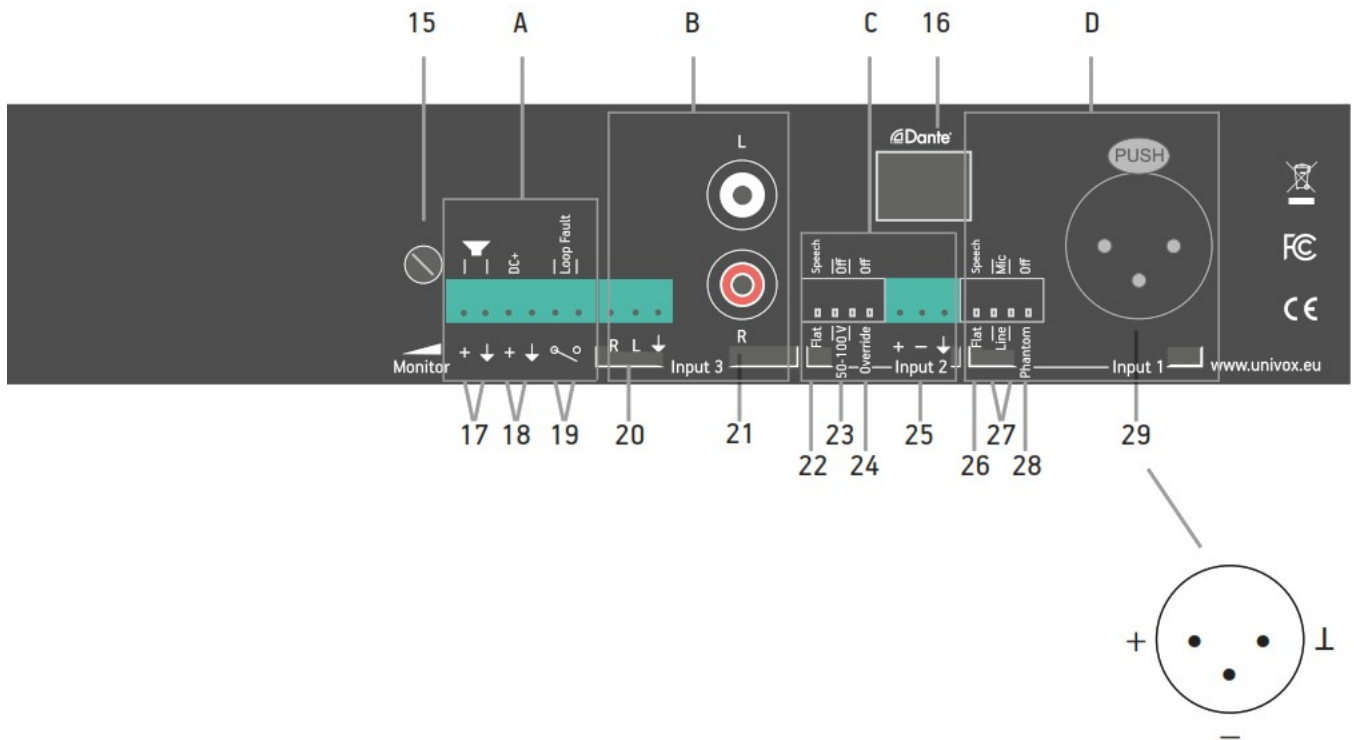


13. DC supply input 14. Loop connector 15. Monitor volume control for both headphones and speaker output 16. Connection to Dante-interface (Univox® PLS-7D, part no 217710) A. MISCELLANEOUS OUTPUTS	17. Monitor speaker connector 18. Auxiliary DC power output 19. Loop fault connector B. INPUT 3 20. Phoenix screw terminal (Unbalanced) 21. Unbalanced RCA
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6. Loop current potentiometer
7. Loop current LED bar graph
8. Peak LED
9. Temp LED

10. Loop fault LED
11. Loop monitor headphones socket
12. Power LED



C. INPUT 2

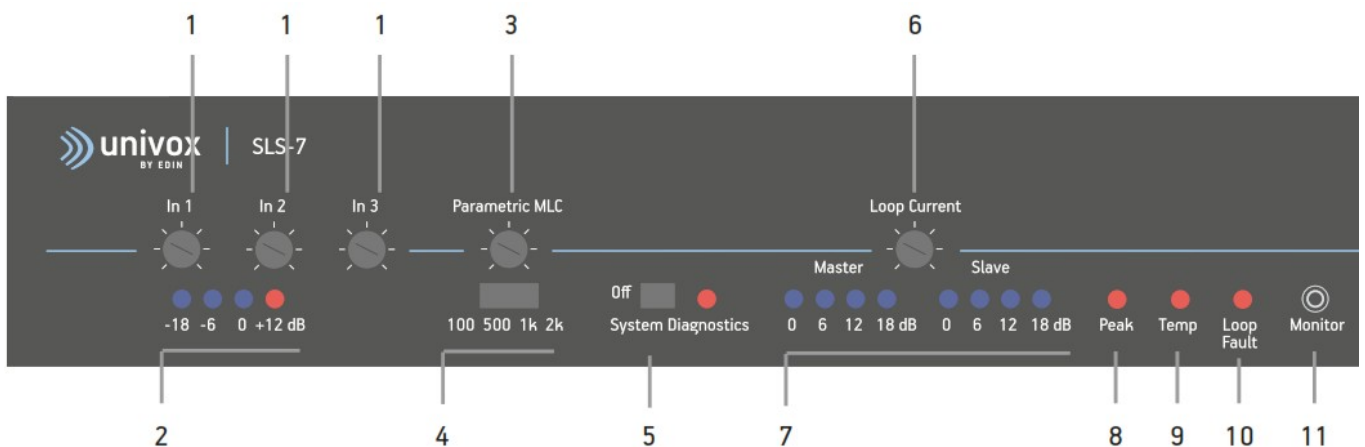
22. Speech enhancement switch (Flat/Speech)
23. 50-100 V Line switches On/Off
24. Override switch On/Off
25. Phoenix screw terminal (Balanced)

D. INPUT 1

26. Speech enhancement switch (Flat/Speech)
27. Line/Mic sensitivity switches
28. Phantom power voltage switch On/Off
29. Balanced XLR

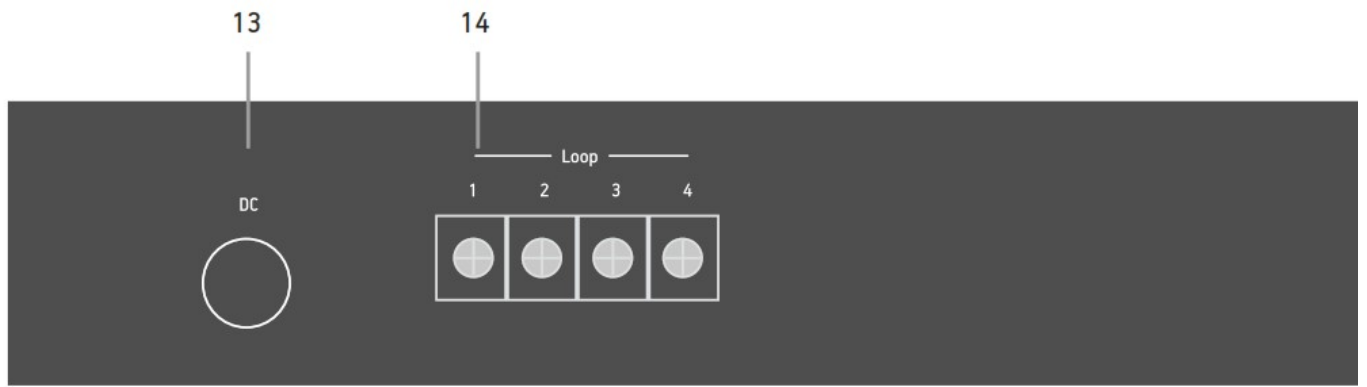
Connections and controls SLS-7

Overview



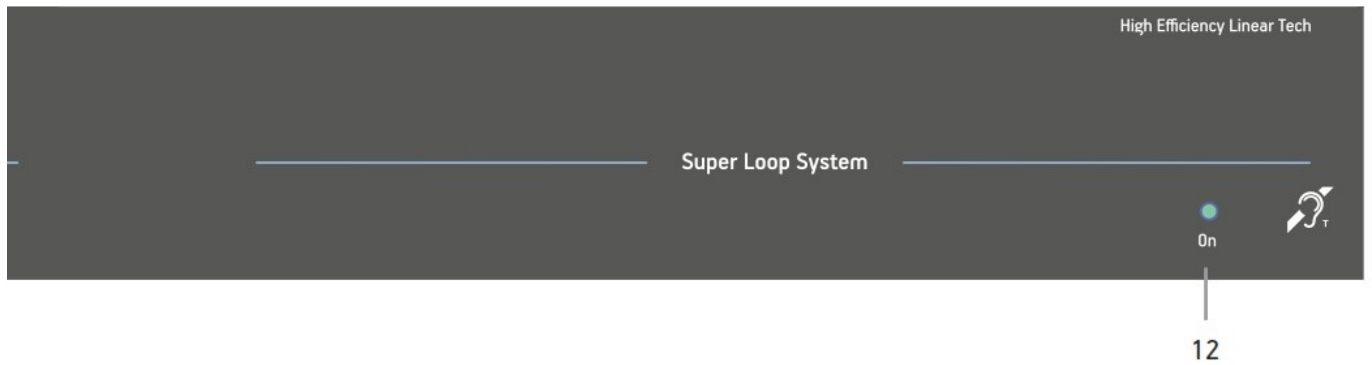
1. Input level potentiometers
2. Input level LED bar graph
3. Parametric MLC control

4. Parametric MLC knee point switch
5. System diagnostics switch and LED



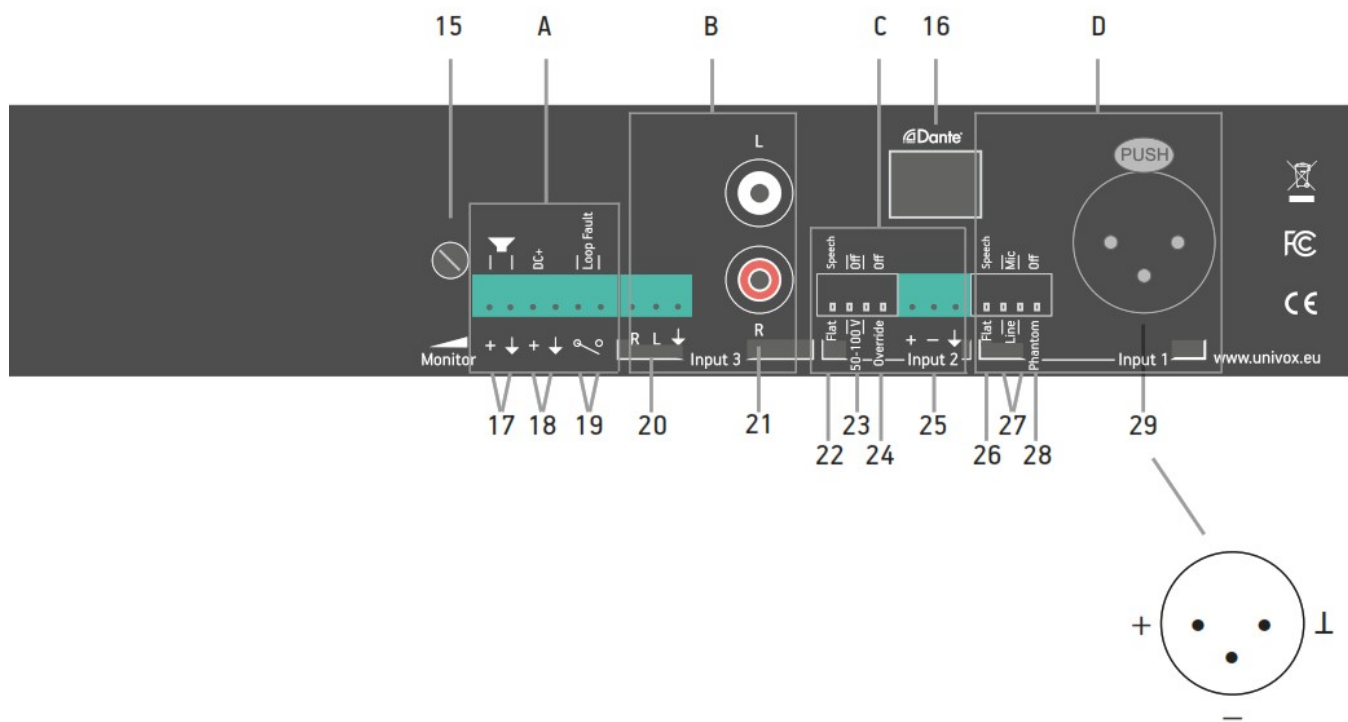
13. DC supply input
 14. Master/Slave loop connector
 15. Monitor volume control for both headphones and speaker output
 16. Connection to Dante-interface (Univox® SLS-7D, part no 227010)
A. MISCELLANEOUS OUTPUTS

17. Monitor speaker connector
 18. Auxiliary DC power output
 19. Loop fault connector
B. INPUT 3
 20. Phoenix screw terminal (Unbalanced)
 21. Unbalanced RCA



6. Loop current potentiometer master/slave
 7. Loop current LED bar graphs
 8. Peak LED Master/Slave
 9. Temp LED

10. Loop fault LED
 11. Loop monitor headphones socket
 12. Power LED



C. INPUT 2

- 22. Speech enhancement switch (Flat/Speech)
- 23. 50-100 V Line switches On/Off
- 24. Override switch On/Off
- 25. Phoenix screw terminal (Balanced)

D. INPUT 1

- 26. Speech enhancement switch (Flat/Speech)
- 27. Line/Mic sensitivity switches
- 28. Phantom power voltage switch On/Off
- 29. Balanced XLR

Description

- 1-2. Input level should be set to 0 dB (ie the 0 dB LED should be lit most of the time during the audio programme The +12 dB LED indicator should not be lit at any time)
- 3-4. Parametric MLC control makes it possible to fine tune the frequency response, compensating for the effects of different metal types and configurations. There are 4 parametric curves starting from; 2 kHz, 1 kHz, 500 Hz and 100 Hz. These set the frequency at which the metal loss correction control starts to compensate. The function is powerful, however excessive compensation can lead to signal limiting in the treble range. If signal limiting occurs the red peak LED illuminates
5. System Diagnostics verifies the integrity and function of the loop driver – inputs, output and the loop condition
Use: Set the switch on the front panel to right position A built-in 16 kHz signal pulses at 2 second intervals at 0 dB, regardless of the adjusted sensitivity. If input and output LEDs flashes in unison, the loop driver functions are verified. If only the input LEDs flashes it indicates that the loop is not connected or the current potentiometer needs to be readjusted. Switch to left position Off, for normal use
6. The loop current control sets the output current, ie the field strength of the loop. The combined Master/ Loop knob controls output current for both master and slave at the same time
7. Loop current LED bar graph indicates the level of the loop current, not the field strength The field. The SLS version has two bars for master and slave. The PLS version has one single bar. Strength is measured using a Field Strength Meter, like Univox FSM
8. Peak (clip) LEDs illuminate when there is insufficient voltage to maintain a constant loop current. Momentary short term voltage clipping is not audible in hearing aids. Compensation from the parametric MLC control may increase the risk of clipping Note: Use ULD for simulation guidance before installation and commissioning
9. Temp LED, Automatic system protective mode activated. Refer to Troubleshooting section.
10. Loop Fault LED, remote output monitor connection; Relay output to a PA system. Monitors the function of the system. Refer to Troubleshooting section.
11. Loop Monitor, supports headphone (10) and speaker outputs (14) representing the sound quality of the loop. Volume control for both headphones and speakers, is set by the potentiometer (15)
12. Power LED verifies power supply connection
13. 4 pin DC Supply socket for secure connection of Univox approved power supplies 90-260VAC, 50-60Hz. Only connect the power to the amplifier before connecting to the network, otherwise there is a risk of sparking
14. Loop screw terminals (PLS) for Master and Slave loop connection (SLS)

15. Monitor volume control for both headphones and speaker output
16. Connection to Dante-interface (Univox® PLS-7D/SLS-7D part no 217710/227010)
- A. MISCELLANEOUS OUTPUTS PHOENIX SCREW TERMINAL** (6 connectors/screws)
17. Monitor speaker connector Pin 1+2 (2=GND), speaker output 8-32 Ω
18. Auxiliary DC power output 15 V-24 V depending on model Pin 3+2 (2=GND), DC 12-18 V output, 100 mA
19. Loop Fault – remote output monitor connection; Monitors the function of the system. Whenever there is an inconsistency of the system a fault signal triggers relay contacts to:
OPEN RELAY = FAULT
CLOSED RELAY (short circuit) = OK
- B. INPUT 3 (PHOENIX SCREW TERMINAL/RCA)**
20. Unbalanced Line: -24 dBu (30 mVrms) to +16.2 dBu (5 Vrms)
21. Unbalanced RCA left/right
- C. INPUT 2 (PHOENIX SCREW TERMINAL)**
- Switchable between line and 50-100 V speaker line input
Note: The speaker line MUST be balanced at the Phoenix connector (connect (+) and (-) terminal)
Use earth ONLY for free-floating screen or leave unconnected
22. Speech filter: Low cut filter 130-170 Hz On/Off Speech Enhancement (Flat/Speech) attenuates low frequencies (<150 Hz) increasing speech intelligibility for microphone use
Note: When commissioning field strength level and frequency response this feature must be switched to Flat position
23. Speaker 50-100 V balanced Line, sensitivity On/Off Caution! 50-100 V/Line must be set prior to any further settings
24. Override/Priority function on In 2 mutes the signals connected to In 1 and/or In 3, is typically used when connecting evacuation alarm signal to In 2.
25. Balanced Line: -15 dBu (50 mVrms) to +20.6 dBu (8.3 Vrms)
- D. INPUT 1 (BALANCED XLR)**
- Balanced XLR. Switchable between Line and Mic sensitivity and with or without Phantom voltage Note: With unbalanced connection (not recommended) the pin not used should be grounded.
26. Speech filter: Low cut filter 130-170 Hz, On/Off Speech Enhancement (Flat/Speech) attenuates low frequencies (<150 Hz) increasing speech intelligibility for microphone use
Note: When commissioning field strength level and frequency response this feature must be switched to Flat position
27. Line/Mic sensitivity switches: -55 dBu (1.5 mVrms) to +10 dBu (2.6 Vrms)
28. Phantom voltage, On/Off
29. Balanced XLR

Installation

Planning

Calculations for coverage area, metal loss, signal sources, power outlets, dissipating heat and ventilation for loop driver placement and other practical installation issues, must be done prior to the on-site installation. Please refer to www.univox.eu/planning

Use Univox Loop Designer (ULD), a free, web-based project planning and design software for easy and accurate assistance in designing loop systems. www.univoxloopdesign.org

Tools required

Copper tape tools, e.g. crimping tool, double-sided adhesive tape, printed warning tape
General audio installation tools, e.g. Ohmmeter
Field strength meter, e.g. Univox FSM
Listening device, e.g. Univox Listener

Loop cable

Always conduct a loop design before installation. Use the same type of wire for the loop as specified in the design.
Use a feed cable (twisted or twin wire) between the junction box and the loop driver, as well as between the loop figuration and the junction box or loop driver.

Placement of the driver

Univox SLS-7/PLS-7 loop drivers will not generate any excessive heat and can be mounted in 19" racks on top of or below other rack components (check that these doesn't generate excessive heat), on a wall or another flat surface. In a rack system it is often practical to attach the external power supply on the supporting metallic construction using straps. For wall mounting, you need to open the chassis to access the mounting holes. Use general basic audio practice while installing and mounting units and wiring, including loop cable. Avoid feedback interference between analog signal source cables and loop cable. The loop cable must not be placed closer than 30cm (12in) to a parallel microphone or mixer cable. Crossing is allowed.

Placement of the microphones

Microphone placement and proximity between microphone and mouth is crucial for improved speech intelligibility. Use shortest distance possible between microphone and mouth/sound source.

Commissioning and certification

Check the system when the installation is completed. Properly installed systems should meet the requirements for field strength, consistency and frequency response according to the international standard IEC 60118-4.

A guide on how to commission a loop system to the IEC performance standard, can be found in the user guide for the Univox FSM field strength meter and in the Univox® Certificate of Conformity available at www.univox.eu/certify.

Maximum recommended segment size (to comply with IEC 60118-4)

Metallic environment	Basic level (1000Hz)	IEC level (1600Hz)	Field Strength Attenuation	Important notes/requirements
No metal	22 m/70 ft	22 m/70 ft	0	
Standard reinforced concrete	7 m/23 ft	5 m/16 ft	3.5-6 dB power	Increased current, voltage and
Heavily reinforced concrete	5 m/16 ft	4 m/13 ft	3.5-6 dB power	Increased current, voltage and
Suspended ceiling	4.8 m/16 ft	3.6 m/12 ft	4-10 dB	Conductor must be centered in the suspended ceiling framework (longest distance to metal) Increased current
Steel deck/ Metal system floor	4 m/13 ft	3 m/10 ft	6-10 dB	Increased current
Iron bar reinforcement construction	m/10 ft	2 m/6.5 ft	4-12 dB	Medium/strong damping, depending on placement of wire (avoid placement along metal bars)

System setup

Start-up procedure

- Each loop must be securely isolated (particularly to safety-ground and other loop connections). Verify the resistance of each loop (approximately 1-3 Ω)
- Connect the input (21/25/29) and output (14) connections
 - SLS model: Connect Master and Slave loop cables. The Master loop cable connects to loop terminal screws 1 and 2. Slave loop connects to terminal screws 3 and 4
 - PLS model: The loop cable connects to loop terminal screws 1 and 4
- Set all level controls to minimum setting:

- System Diagnostics (5) = Off
 - Parametric MLC (4) = 2 kHz
4. Connect the Power supply (13) and verify Power LED indication (12)
 5. Activate System Diagnostics. Input level bar graph peaks (2) to 0 dB. Output bar graph (7) does not indicate.
NOTE: The Loop Fault LED (10) will be lit during this setup to verify the feature function. SLS-model: If both Master and Slave loops are not connected the Loop Fault LED will be lit.
 6. Adjust the output level. Input and output bar graphs indicate in unison. Loop Fault LED will go out.
NOTE: 2-turn loop is often more efficient, see the Output connections and adjustments section. In some installations, field strength adjusted to -12 dB in coverage and frequency test measurement during commissioning, might trigger the Loop Fault LED due to low output current. When adjusting current and magnetic field to 0 dB in further commissioning steps the Fault LED will go out.
 7. Check the field strength with a field strength meter, e.g. FSM for all loop segments. Verify low field strength directly above wires and high in between segments (peaks to approximately -2 dB). If not, there might be a local short circuit between wires
 8. Basic function of the loop system is now verified. Turn System Diagnostics off and proceed with Input adjustments

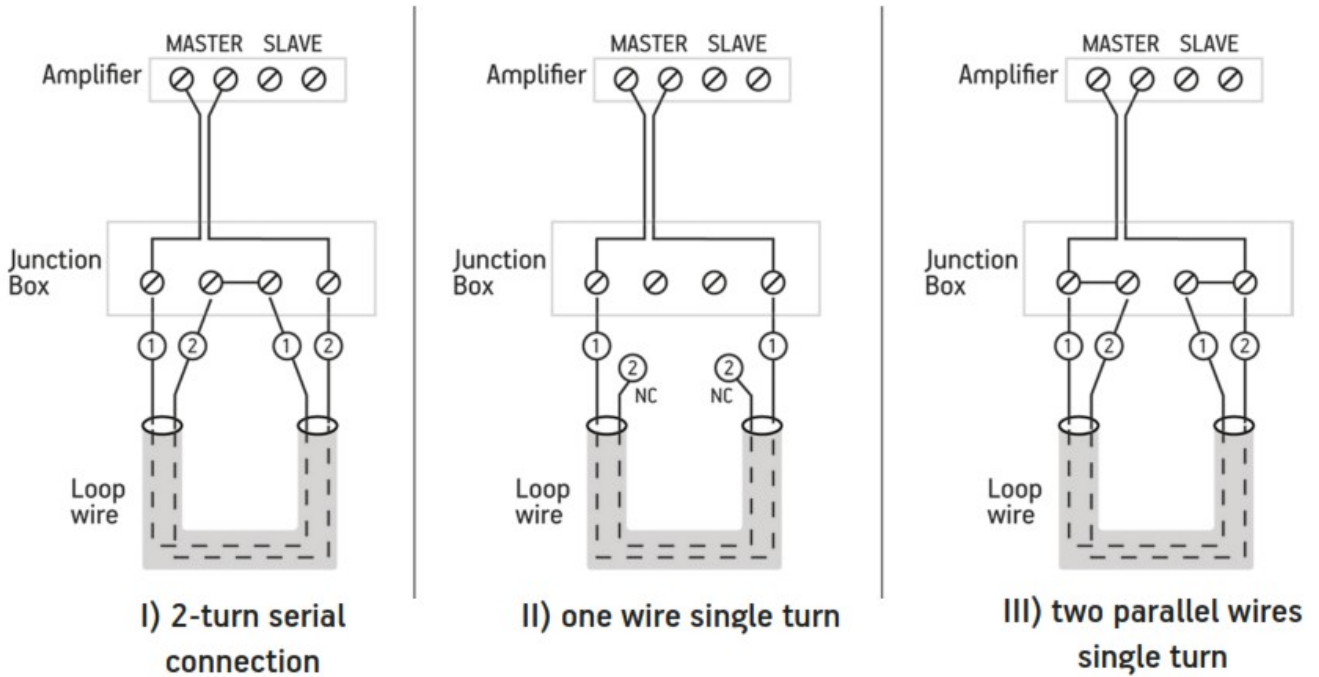
Input connection and adjustments

9. Set all level controls to minimum setting:
 - System Diagnostic (5) = Off
 - Parametric MLC (4) = 2 kHz
10. Connect the main audio source to the amplifiers input (B, C or D)
11. Adjust input level (1) to 0 dB at input bar graph (2). If using a 1 kHz pulsed sine wave signal, simply set to 0 dB.

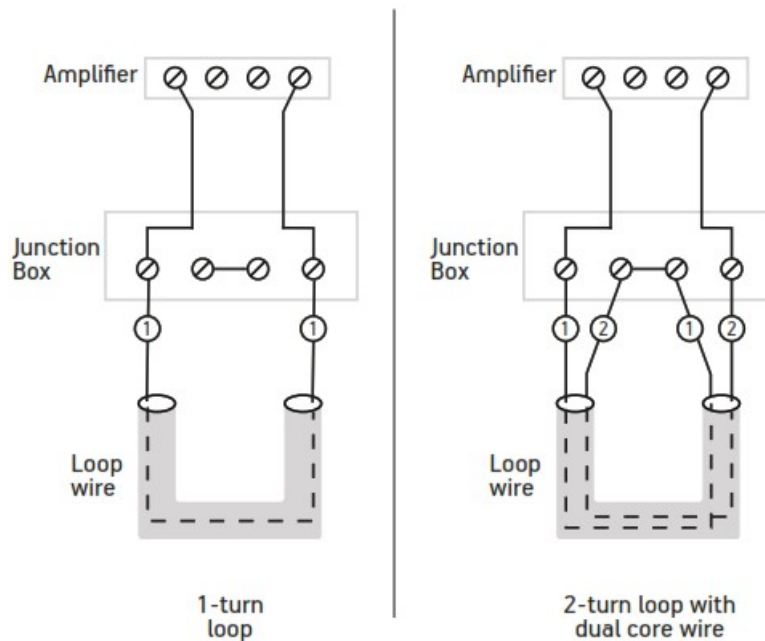
Output connection and adjustments

12. Field strength setting: Start with the highest efficiency connection, I) 2-turn serial connection. For loop connection use a junction box, see the diagram below.
13. Set field strength (6) in range -3 dB to 0 dB at the peaks. If Peak (8) LED flickers occasionally the connection is acceptable. If the Peak LED is lit continuously, try with following loop figurations by switching the connections in the junction box: II) one wire single turn and then III) two parallel wires single turn. With this procedure the unit will operate with the highest output possible without generating any heat.

SLS-7



PLS-7



Note: To quickly set up the field strength for a programme material, a PPM instrument, like the Univox Listener can be helpful. The Univox Listener has a calibrated level indicator that quickly detects the highest peak.

Note: The field strength peaks should be adjusted to -2 dB field to suit dynamic headroom in various hearing aids

14. Check basic frequency response according to IEC 60118-4, using a field strength meter, e.g FSM. If necessary, follow Frequency adjustment procedure (see page 12).
15. Check the sound quality by using an external listening device (Univox Listener or FSM), Monitor speaker connector (17) or Monitor (11) for headphone (volume control on rear panel Monitor (15)). When operating at maximum output on low impedance, i.e single turn loops, the automatic limit protection circuit may cut programme peaks. This can be avoided by changing to a 2-turn loop or reduce the output current setting.

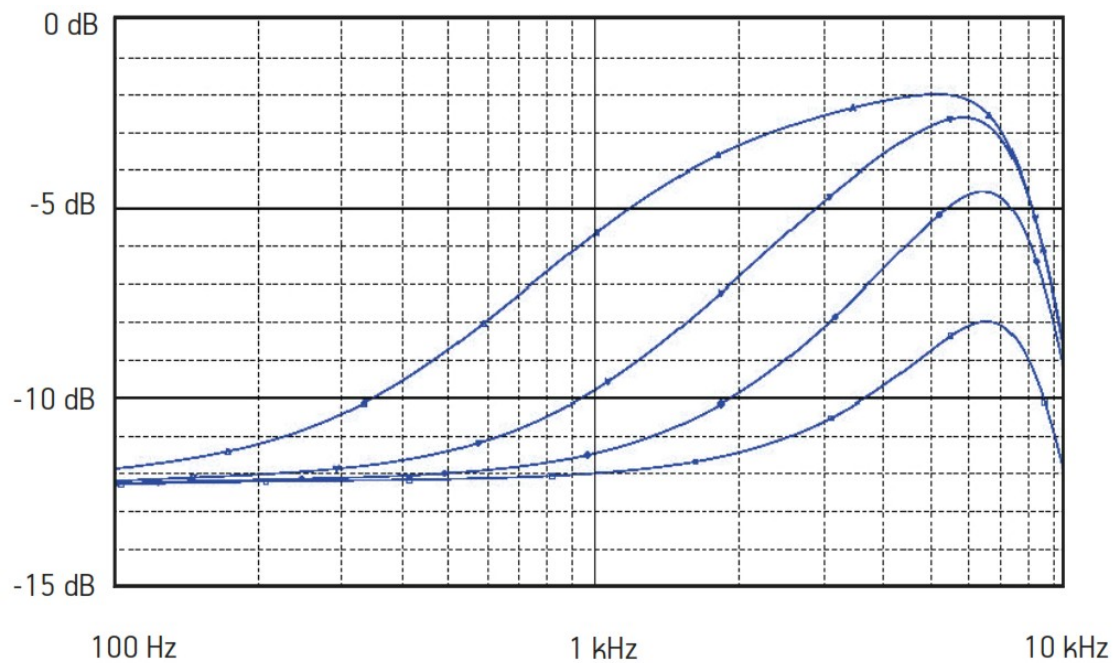
16. Start the Commissioning process to certify the installation (see page 9).

Metal Loss Correction frequency setting

The degree of compensation for metal loss is adjusted with the MLC potentiometer (3). The start/break frequency is set with the Parametric MLC knee point switch (4) marked: 100 Hz, 500 Hz, 1 kHz, 2 kHz.

1. Start with the break frequency set to 2 kHz.
2. Adjust the level to -12 dB. If this is not sufficient, move to the next lower frequency and repeat as required.
3. Verify that the loop driver's voltage does not saturate, i.e. that the peak indicator (8) only flickers occasionally.

MLC function in maximum position



Troubleshooting

Symptom	Possible cause	Solution
General malfunction		Check the system with the start-up procedure. See page 10.
Loop fault LED On	No input signal No output signal Loop not connected properly	Check the input signal Both master and slave loop must be connected Check the loop connection
Power LED is off	Power supply not connected Power supply faulty	Connect power supply correctly Replace power supply
Input and output LEDs flash on and off	System Diagnostics turned on	Turn System Diagnostics off
Temp LED On	Excessive heat	Disconnect the supply voltage. Verify the loop connection: Slave and Master loop must be insulated, must not be short-circuited to safety ground. Reconnect the supply voltage. If the error signal remains, contact Univox support.
Audio quality is poor, peak LED is off, sound quality using headphone is also poor	Input signal set too high Audio source is of poor quality	Reduce input signal level and check Line/Mic level setting Change/adjust audio source
Audio quality is poor, peak LED indicates	Malfunction loop cable Loop impedance is too high Loop current set too high Parametric MLC set too high	Repeat start-up procedure (page 10) Change the loop• use twin cores in parallel or use a cable with larger cross-section Turn loop current down Turn down Parametric MLC
Output current LEDs are off, input LEDs are on	Loop current turned down	Adjust Loop current
Output and input LEDs are off, power LED is on	No input signal Input signal set too low	Check if input signal is present Adjust level of input signal
Intelligibility of sound from microphone is poor	Low frequency masking Poor microphone user techniques	Turn the speech enhancement filter on Instruct user/reduce speaking distance
Microphone connected, input LEDs are off	Phantom power not turned on Input level too low Microphone needs higher phantom voltage Microphone/LED/connectors faulty	Turn phantom power on Increase input level/reduce speaking distance Use valid microphone or connect a microphone mixer (amplifier) Exchange faulty part
Alarm/priority signal is not clear	Override DIL switch not set to allow this function	Set DIL switch to correct position
Cannot achieve required frequency response at 100 Hz	Speech enhancement filter turned on	Turn the speech enhancement filter off
Cannot achieve required frequency response at 5 kHz	Parametric MLC not set correctly Frequency dependent losses too high for parametric compensation	Set Parametric MLC to correct level Use smaller/multiple loops

Safety

The equipment should be installed by an audio visual technician observing 'good electrical and audio practice' at all times and following all the instructions within this document.



Only use the power adapter supplied with the unit. If the power adapter or cable is damaged, replace with a genuine Univox part.

Power adapter must be connected to a mains outlet close to the amplifier and easily accessible. Connect the power to the amplifier before connecting to the network, otherwise there is a risk of sparking.

The installer is responsible for installing the product in a way that may not cause risk of fire, electrical malfunctions or danger for the user. Do not cover the power adapter or loop driver. Only operate the unit in a well ventilated, dry environment.



Do not remove any covers as there is a risk of electric shock. There are no user serviceable parts inside. Refer servicing to qualified personnel. Please observe that the product warranty does not include faults caused by tampering with the product, carelessness, incorrect connection/mounting or maintenance.

Bo Edin AB shall not be held responsible or liable for interference to radio or TV equipment, and/or to any direct, incidental or consequential damages or losses to any person or entity, if the equipment has been installed by unqualified personnel and/or if installation instructions stated in the product Installation Guide have not been strictly followed.

Warranty

This loop driver is supplied with a 5-year (return to base) warranty.

Misuse of the product in any way including but not limited to:

- Incorrect installation
- Connection to non-approved power adapter
- Self oscillation resulting from feedback
- Force majeure e.g. lightning strike
- Ingress of liquid
- Mechanical impact

will invalidate the warranty.

Maintenance and care

Under normal circumstances the product does not need any special maintenance.

Should the unit become dirty, wipe it with a clean damp cloth. Do not use any solvents or detergents.

Service

Should the system not work as expected, please follow Checklist for installation found on www.univox.eu/support or contact the local distributor for further instructions.

Before returning a product to us for service you will need a Service Number from your distributor. They will also send you a Service Report Form which must be completed and returned with the product.

Technical data

For additional information, please refer to product data sheet and CE certificate which can be downloaded from www.univox.eu/products. If required, other technical documents can be ordered from support@edin.se.

Environment

To prevent possible harm to the environment and human health, please dispose of the product responsibly by following statutory disposal regulations.



Measuring devices


Univox® FSM Basic, Field Strength Meter

Professional instrument for measurement and certification of loop systems in accordance with IEC 60118-4.

Univox® Listener, testing device

Loop receiver for fast and simple check of the sound quality and basic level control of the loop.

Technical data

Technical data	Univox PLS-7/PLS-7D	Univox SLS-7/SLS-7D
Induction Loop Output: RMS 125 ms		
Max Drive Voltage	100 Vpp	100 Vpp
Max Drive Current	20 Arms	2 x 10 Arms
Power supply	110-240 VAC primary switched class VI electronic power supply; Enhanced power connection with 4-pin DIN power connector	
Input 1	Balanced XLR, Line/Mic; Phantom Power +12 VDC On/Off Sensitivity -55 dBu (1.5 mVrms) to +10 dBu (2.6 Vrms)	
	Dante RJ-45 ethernet input PoE (option)	
Input 2	Balanced phoenix screw terminal block. Dip switch programmable: Low cut filter@150 Hz – Flat/Speech; Line/50-100 V connection On/Off; Override On/Off (Input 3 signals higher than -6 dB above AGC-knee overrides all other input signals)	
Input 3	Unbalanced RCA or Phoenix Screw Terminal Block Sensitivity: -24 dBu (30 mVrms) to +16.2 dBu (5 Vrms)	
Monitor control	10 W speaker and 3.5 mm front panel headphone output	
Loop error	Speaker monitor output; 24 V power output; Relay output to mixer	
Frequency response	75-6800 Hz	
Distortion, Power Loop Driver	< 0.05 %	
Distortion, system	< 0.15 %	
Dual Action AGC	Dynamic Range: > 50-70 dB (+1.5 dB) Attack time: 2-500 ms, Release time: 0.5-20 dB/s	
Cooling	Fan free convection cooling (chassis cooling)	
IP class	IP20	
Size	1U/19 " rack mount. WxHxD 430 mm x 150 mm x 44 mm (incl. rubber feet)	
Weight (net)	2.30 kg	2.31 kg
Mounting options	Rack mount (brackets included), wall mount or freestanding	
Part No	217700/217710 (Dante)	227000/227010 (Dante)

Product is designed to meet the system requirements of IEC60118-4, when correctly designed, installed, commissioned and maintained. Specification data complied according to IEC62489-1.



Notes_____

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Hearing excellence since 1965



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Documents / Resources

	<p>Univox 7-Series High Efficiency Linear Technology [pdf] Installation Guide PLS-7, SLS-7, 7-Series High Efficiency Linear Technology, High Efficiency Linear Technology, Efficiency Linear Technology, Linear Technology, PLS-7D, SLS-7D</p>
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References

- [» Planning | Bo Edin AB](#)
- [» Consultation and support | Bo Edin AB](#)
- [» Univox Loop Designer](#)
- [User Manual](#)

Manuals+.